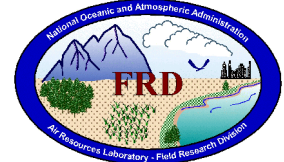


# FRD Activities Report November 2001



## Research Programs

### *Forecasting for the 2002 Winter Olympics*

Kirk Clawson attended the Intermountain Meteorological Workshop held on the University of Utah campus on November 2. The focus of the workshop was on weather forecasting for the 2002 Winter Olympics. For the first time ever in this nation, weather forecasting for the Olympics will be a partnership shared by private firms, a university, and the federal government. The NWS will provide standard forecasts and model output. The University of Utah will provide ADAS surface analyses and detailed MM5 mesoscale model output based on NCEP model runs. Finally, a private consortium of meteorological companies will provide on-site weather forecasters at each one of the Olympic venues. All official Olympic forecasts will be issued by this latter group of meteorologists.

One item of interest is the competing desires of the various Olympic groups as far as desired weather is concerned. The various downhill, bobsled and luge runs want clear, sunny weather. They will make their own snow so that conditions will be consistent from the top of the run to the bottom. If it snows, both mechanical and manual effort must be invoked to remove the snow. However, with clear, sunny skies, atmospheric mixing conditions in the Salt Lake Valley becomes stagnant under strong temperature inversions. Air quality degrades significantly, thus degrading the air quality where the Olympic medal ceremonies will be held. Thus, the people who run the ceremonies want it to snow every night to keep the temperature inversion from forming and to provide a festive backdrop for the celebration. It will be interesting to see what really happens! (Kirk.Clawson@noaa.gov)

### *CBLAST-Low*

A draft of a NOAA technical memorandum entitled *Aircraft measurements in the Coupled Boundary-Layers Air-Sea Transfer (CBLAST) light wind pilot field study* has been completed and submitted to ARL for review and comment. (Jerry.Crescenti@noaa.gov)

Tami Grimmett, the NRC Postdoctoral Fellow who joined FRD last month, has started on developing an algorithm that will merge GPS altitude data and altitudes provided by three Riegl lasers to determine a more accurate altitude estimate. After installing and becoming familiar with several specialized software packages, she is also doing background preparation for a project to determine a low-wind speed cutoff for accurately determining SAR-derived fluxes. (Tami.Grimmett@noaa.gov)

## ***VTMX/URBAN 2000***

A data report is being prepared entitled *Meteorological measurements during the VTMX/URBAN 2000 field study* by Kirk Clawson and Jerry Crescenti. This report will summarize the meteorological measurements acquired during the VTMX/URBAN 2000 field study which include two sonic anemometers deployed in downtown Salt Lake City, and a 10-m tower, Doppler sodar and radar wind profiler deployed at the Raging Waters entertainment theme park about 5 km southwest of the city center. (Jerry.Crescenti@noaa.gov, Kirk Clawson).

An abstract for an upcoming paper entitled *Katabatic flow and turbulence as seen from airborne in-situ measurements and ground-based profiler measurements during VTMX* by Ron Dobosy, E. J. Dumas, and G. H. Crescenti has been submitted to the American Meteorological Society for the Fourth Symposium on the Urban Environment to be held on May 20-24 in Norfolk, Virginia. This paper combines the LongEZ aircraft data and the Doppler sodar and radar wind profiler data used during the VTMX/URBAN 2000 field study. (Jerry.Crescenti@noaa.gov)

## ***Tracer Technology***

The TGA-4000 continuous SF<sub>6</sub> analyzer that had been sent off for repair was returned this month. Some minor shipping damage to one of the LCD displays had to be repaired. The system has been checked out as completely operable and ready for use. We have also designed an electronic filter that may be added to the TGA output to reduce the baseline noise by 50-70 per cent. We hope to add these to all the analyzers before the next project. (Roger.Carter@noaa.gov)

Software for the upgraded Automated Tracer Gas Analysis System (ATGAS) has been completed and tested. The prototype system was used in a production mode for several days this month and performed very well. Construction of three more systems to replace the aging systems currently in use is under way. (Roger.Carter@noaa.gov, Debbie Lacroix, Shane Beard)

## **Cooperative Research with INEEL**

### ***Emergency Operations Center (EOC)***

The Emergency Operations Center held one more class on November 1 to complete its annual requalification cycle. The class was primarily for the benefit of those who were scheduled to participate in the September session that was cancelled because of the terrorist activity. The class covered EOC's Information Management Program and the resulting changes in paperwork. (Richard Eckman@noaa.gov. and staff)

### ***INEEL Support***

Meetings were held in November with several users of FRD's MDIFF dispersion products. These users include INEEL DOE and contractor staff together with the State of Idaho's Department of Environmental Quality. The meetings focused on what kinds of future upgrades would be desirable for either the MDIFF model or its graphical interface INEELVis. The most desirable

upgrade, requested particularly by the State of Idaho, is a capability to estimate the deposition of radioactive material. MDIFF currently has no deposition algorithms. Another possible upgrade is an ability to break down the total radiation dose into specific exposure pathways. FRD is looking into the options for upgrading the dispersion modeling. One option is to add the required algorithms to MDIFF. Another possibility is to replace MDIFF with an alternative model that already has the desired algorithms. The attraction of the latter option is that it may save a lot of time. A couple of potential alternatives have already been identified, namely the CALPUFF model and the APGEMS model from Pacific Northwest National Laboratory.  
(Richard.Eckman@noaa.gov)

INEEL has requested that FRD run a series of puff-model simulations using several years of data from the FRD Mesonet. The idea is to build up an ensemble of concentration estimates at each point in the model domain. From these ensembles, it will be possible to pull out the 95<sup>th</sup> percentile concentration. These 95<sup>th</sup> percentiles are used by INEEL in their environmental planning.  
(Richard.Eckman@noaa.gov)

The EMWIN system at the INEEL Emergency Operations Center was repaired and secured for winter. The antenna cable had been disconnected, presumably by wind action. The cable was reconnected and secured, and the sand bags holding the dish antenna in place were replaced. The EMWIN system collects National Weather Service information via a GOES satellite link. It is in place in the EOC as a back up to our regular Internet based data service.  
(Roger.Carter@noaa.gov, Shane Beard)

### ***INEEL Mesoscale Meteorological Network***

The fall 2001 semi-annual inspection of the meteorological instruments on the 36 network towers were completed this month. During the inspections, all instruments are examined to verify they are operating properly, calibrated to traceable NIST standards, and the data collected is accurate and complete.

### ***INEEL Mesoscale Modeling***

The MM5 modeling at FRD proceeded fairly smoothly during November. A minor problem erupted towards the end of the month when the NWS moved all their model forecast products to a new ftp server. MM5 uses these products for initial and boundary conditions. The transition from the old to the new server occurred fairly abruptly, which caused some disruption in the model runs at FRD. Graphical output from the MM5 simulations are now being posted on the FRD web page under the Weather menu. Work is also under way to post text output for specific locations at INEEL. (Richard.Eckman@noaa.gov)

The cloud microphysics scheme currently being used in the FRD MM5 runs came under some scrutiny in November. A simple ice scheme was being used, which assumes all hydrometeors are frozen below 0°C and liquid otherwise. This scheme cannot therefore account for supercooled water, which is common in clouds down to -20°C. There was some concern that this scheme may be creating too much ice-cloud cover, which could in turn lead to a negative temperature bias at the surface. The simple-ice scheme has been replaced by the so-called Schultz scheme in the

latest simulations. This scheme keeps track of five hydrometeors: cloud water, cloud ice, rain, snow, and graupel. Interactions among the hydrometeors are kept simple enough in this scheme to prevent the execution time from increasing enormously. Still, the scheme does have a noticeable impact on execution time, although it is currently not enough to cause problems. (Richard.Eckman@noaa.gov)

### ***DOE-ID Statement of Work***

The annual Statement of Work was prepared and submitted to DOE-ID. It included a commitment to revise the *Climatology of the INEEL*. We have also been working with DOE-ID to write a new Interagency Agreement. Our current Interagency Agreement is now 13 years old. DOE-ID wants to include wording that makes us subject to oversight by their local maintenance and operations contractor, who is currently Bechtel, Babcock and Wilcox, Inc. We question the legality of requiring the work done by a federal agency to be managed by a contractor of another federal agency. We are working with NOAA legal counsel to eliminate this problem. (Kirk.Clawson@noaa.gov)

## **Other Activities**

### ***NOAA Light Aircraft Workshop***

On November 14-16, 2001, FRD staff participated in the NOAA Light Aircraft Workshop hosted by the Office of Marine and Aviation Operations in Silver Spring, MD. FRD's presentation was titled "Small Environmental Research Aircraft (SERA) - ARL's Light Aircraft Need". The presentation explained the need for a SERA to support ARL's air-surface exchange, air quality and air chemistry research. The proposed SERA would allow a balance to be developed between cost, availability and capability. The proposed shift to lower-cost small aircraft is made possible by the decreasing size and increasing power of scientific instrumentation. (Tim.Crawford@noaa.gov and Tom Watson)

### ***First International NAERS Workshop***

FRD staff are preparing to host the First International Workshop of the Network of Airborne Environmental Research Scientists (NAERS) on January 28 and 29, 2002. NAERS is an international network of scientists cooperating in the use of Small Environmental Research Aircraft (SERA), airborne instrumentation, and airborne data to investigate and solve environmental problems. The workshop goal is to enhance the effectiveness of airborne research efforts and the utility of the resulting science. The agenda for the workshop is at <http://www.noaa.inel.gov/docs/workshop.pdf> (Tim.Crawford@noaa.gov, Jerry Crescenti and Jeff French)

### ***Plan for ARL Operation of a Small Environmental Research Aircraft (SERA)***

A document outlining justification for the acquisition of a specialized, small aircraft by the NOAA Air Resources Laboratory for use in environmental research and documenting the operating procedures for the aircraft was prepared and submitted to ARL headquarters. This document describes the types of research that will be performed with the aircraft, the specialized characteristics of the aircraft necessary to accomplish ARL research goals, and outlines the SOPs for maintenance, operation, and modification of the aircraft. It also describes the training and experience requirements for SERA pilots. (Tom.Watson@noaa.gov)

### ***Health Fair***

On November 8, FRD federal employees attended the Annual Health Fair sponsored by DOE-Idaho at the DOE facility. This one day event was open to all federal agencies in southeast Idaho. There were representatives from Blue Shield/Blue Cross and Mailhandlers insurance carriers available to answer questions about the health plans and the changes that will be effective in January 2002. Medical technicians were on site to take blood pressure, do a body fat analysis, and do a diabetes test. There were a variety of local health and medical vendors on site as well as the Idaho Falls policeman who talked about child safety in a car seat, and firemen who discussed the proper use of a fire extinguisher and other safety issues. (paula.fee@noaa.gov)

### ***Proposals***

*Small Scale Spatial Variation of CO<sub>2</sub> Flux: Measurement and Interpretation*, by Gennaro H. Crescenti, Timothy L. Crawford, Ronald J. Dobosy, and Douglas C. Vandemark, Letter of Intent submitted to NASA Research Announcement NRA 01-OES-03 (Ocean, Ice, and Climate).

### ***Papers***

K. L. Clawson, D. J. Lacroix, R. G. Carter, K. J. Allwine, and J. Shinn. 2002. URBAN SF<sub>6</sub> atmospheric tracer results from the suburban experiment domain. American Meteorological Society, 4<sup>th</sup> Urban Meteorology Conference. Submitted.

Clawson, K. L., and G. H. Crescenti,. 2001. Meteorological measurements during the VTMX/URBAN 2000 field study. NOAA Data Report, OAR ARL, Silver Spring, MD, in preparation.

Crescenti, G. H., J. R. French, and T. L. Crawford. 2001. Aircraft measurements in the Coupled Boundary-Layers Air-Sea Transfer (CBLAST) light wind pilot field study. NOAA Technical Memorandum OAR ARL, Silver Spring, MD, submitted for ARL review.

Dobosy, R. J., E. J. Dumas, and G. H. Crescenti. 2002. Katabatic flow and turbulence as seen from airborne in-situ measurements and ground-based profiler measurements during VTMX. Preprint, *Fourth Symposium on the Urban Environment*, Norfolk, VA, May 20-24, Amer. Meteor. Soc., abstract submitted.

### ***Travel***

Tim Crawford and Tom Watson attended the AOC workshop on light aircraft, Silver Spring, November 14-16, 2001.

Kirk Clawson traveled to Salt Lake City, UT, to attend the Intermountain Meteorological Workshop and the Mesowest users meeting, November 1-2.